

CLAIMS

1) An improved device for measuring physical characteristics of a porous solid sample by performing successive drainage and imbibition phases, in the presence of a first electricity-conducting fluid and of a second fluid of lower density than the first fluid, provided with a rotatably mobile equipment including at least one elongate vessel (13) provided with an inner cavity for the sample, the vessel being fastened to the end of an arm (9) secured to a fulcrum pin (10) and associated with balancing means (12, 14), motive means (10) intended to drive the arm in rotation and to create a centrifugal force exerted along the direction of elongation of the vessel, characterized in that it comprises a system (17, 24) for forcing displacement at least of the fluid having the lower density, and interface position detection means externally connected to detection means by a rotating connector, comprising a capacitive sonde (5) placed in the vessel, along the direction of elongation thereof, allowing to continuously follow displacements of the interface between the two fluids in the vessel.

2) A device as claimed in claim 1, characterized in that capacitive sonde (5) comprises for example a metallic rod (6) coated with a thin layer (7) of a dielectric material, the sonde is connected to a device (23) intended to measure the capacitance variation of the sonde in contact with the fluids in vessel (13), resulting from the immersion thereof in said conducting fluid.

3) A device as claimed in claim 1 or 2, comprising a measuring and control system (E) intended to control at least one fluid transfer so as to maintain the interface between the two fluids at a determined level in vessel (13).

4) A device as claimed in claim 3, characterized in that measuring and control system (E) is stationary and connected to the vessel by connection means including a sealed rotating electro-hydraulic connector (17), hydraulic lines (15, 16, 19, 20) and electric linking means (18), system (E) comprising a pump (24) for the fluid having the lower density, a tank for collecting at least part of the fluid expelled from the sample and a programmed micro-computer (26) for acquisition of signals delivered by device (23) and control of fluid transfers, so as to maintain the interface between the two fluids at a constant level during operation.

10 5) A device as claimed in any one of the preceding claims 1 to 3, comprising a rotating electro-hydraulic connector (17) with two sealed hydraulic channels, a first channel being connected to the hydraulic system, tank (25) being stationary and connected to the vessel by means of the second channel of said connector (17).

15 6) A device as claimed in any one of claims 1 to 3, comprising a rotating electro-hydraulic connector provided with at least one sealed hydraulic channel connected to the hydraulic system, said tank (27) being secured to the mobile equipment.

20 7) A device as claimed in any one of claims 1 to 3, comprising a rotating electro-hydraulic connector (17) with two sealed hydraulic channels communicating the hydraulic system with two vessels (13, 14) arranged symmetrically and driven in rotation by motive means (10), said tank (27) secured to the mobile equipment receiving fluid from the two vessels (13, 14).

8) A device as claimed in any one of claims 1 to 2, comprising a measuring and control system (E) intended to control at least one fluid transfer so as to maintain the interface between the two fluids at a determined level in vessel (13) said measuring and control system (E) including means for determining various physical parameters of the sample by taking account of the amounts of the two fluids displaced during operation.